Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-27. (Canceled)

28. (New) A distributed feedback laser for generating a laser light, the distributed feedback laser comprising:

a semiconductor substrate;

a first cladding layer disposed on or over the semiconductor substrate;

a second cladding layer, the first cladding layer and the second cladding layer forming an optical waveguide for the laser light; and

an optical cavity disposed between the first cladding layer and the second cladding layer and used to generate the laser light, the optical cavity comprising a first active region comprising at least one first active layer formed of a high reactivity material, the at least one first active layer extending continuously in a direction of propagation of the laser light, and a second active region comprising at least one second active layer formed of a low reactivity material, the high reactivity material being more susceptible to oxidation when etched than the low reactivity material.

29. (New) The distributed feedback laser of claim 28, wherein the second active region comprises a plurality of periodic structure elements arranged in the direction of propagation of the laser light.

30. (New) The distributed feedback laser of claim 29, wherein the plurality of periodic structure elements are formed by etching grooves through the at least one second active layer to form a grating.

31. (New) The distributed feedback laser of claim 30, further comprising a buffer layer disposed between the first active region and the second active region, wherein the buffer layer serves as an etch stop layer when forming the plurality of periodic structure elements.

32. (New) The distributed feedback laser of claim 31, wherein the first and second cladding layers are doped with opposite dopant types, and wherein the buffer layer is doped with same dopant type as the second cladding layer.

33. (New) The distributed feedback laser of claim 31, further comprising a filler layer formed adjacent and between the plurality of periodic structure elements.

34. (New) The distributed feedback laser of claim 28, wherein at least one of the first active region and the second active region comprises a single quantum well active region, a multi-quantum well active region, quantum wires or quantum dots.

35. (New) The distributed feedback laser of claim 28, wherein the first active region comprises a first multi-quantum well active region including a plurality of first active layers separated by a plurality of first barrier layers and the second active region

comprises a second multi-quantum well active region including a plurality of second active layers separated by a plurality of second barrier layers.

36. (New) The distributed feedback laser of claim 35, wherein conduction band offsets for the first multi-quantum well active region is larger than conduction band offsets for the second multi-quantum well active region.

37. (New) The distributed feedback laser of claim 36, wherein an optical gain and a differential gain of the first multi-quantum well active region is higher than an optical gain and a differential gain of the second multi-quantum well active region.

38. (New) The distributed feedback laser of claim 28, wherein the high reactivity material comprises aluminum.

39. (New) The distributed feedback laser of claim 28, wherein the high reactivity material comprises antimony.

40. (New) A distributed feedback laser for generating a laser light, the distributed feedback laser comprising:

a semiconductor substrate;

a lower cladding layer disposed on or over the semiconductor substrate;

an upper cladding layer, the upper cladding layer and the lower cladding layer forming an optical waveguide for the laser light; and

an optical cavity disposed between the lower cladding layer and the upper cladding layer and used to generate the laser

light, the optical cavity comprising a lower active region comprising one or more lower active region quantum wells formed of a high reactivity material, the one or more lower active region quantum wells extending continuously in a direction of propagation of the laser light, and an upper active region comprising one or more upper active region quantum wells formed of a low reactivity material, the high reactivity material being more susceptible to oxidation when etched than the low reactivity material.

41. (New) The distributed feedback laser of claim 40, wherein the upper active region comprises a plurality of periodic structure elements arranged in the direction of propagation of the laser light.

42. (New) The distributed feedback laser of claim 41, wherein the high reactivity material comprises aluminum.

43. (New) The distributed feedback laser of claim 41, wherein the high reactivity material comprises antimony.

44. (New) The distributed feedback laser of claim 41, further comprising a buffer layer disposed between the lower active region and the upper active region, wherein the buffer layer serves as an etch stop layer when forming the plurality of periodic structure elements in the upper active region.

45. (New) The distributed feedback laser of claim 44, wherein the upper and lower cladding layers are doped with opposite dopant types and wherein the buffer layer is doped with same dopant type as the upper cladding layer.

46. (New) The distributed feedback laser of claim 44, further comprising a filler layer formed adjacent to and between the plurality of periodic structure elements of the upper active region.

47. (New) The distributed feedback laser of claim 40 wherein conduction band offsets for the lower active region is larger than conduction band offsets for the upper active region.

48. (New) A method for eliminating mode degeneracy and providing single longitudinal mode oscillation in a distributed feedback (DFB) laser, the method comprising:

forming a first cladding layer on or over a semiconductor substrate;

forming a first active region on or over the first cladding layer, the first active region comprising a high reactivity material extending continuously in a direction of propagation of the laser light;

forming a second active region to form an optical cavity comprising the first and second active regions and for generating a laser light, the second active region comprising a plurality of periodic structure elements comprising a low reactivity material and arranged in the direction of propagation of the laser light; and

forming a second cladding layer on or over the second active region, the first and second cladding layers forming an optical guide for the laser light.

49. (New) The method of claim 48, wherein the high reactivity material comprises aluminum.

50. (New) The method of claim 48, wherein the high reactivity material comprises antimony.

51. (New) The method of claim 48, further comprising forming a buffer layer on the first active region prior to forming the second active region, wherein the buffer layer serves as an etch stop layer when forming the plurality of periodic structure elements in the second active region.

52. (New) The method of claim 48, further comprising depositing a filler layer adjacent to and between the plurality of periodic structure elements of the second active region.